

# PATENT SPECIFICATION

484,114



Application Date : Nov. 2, 1936. No. 29775/36.

Complete Specification Accepted : May 2, 1938.

## COMPLETE SPECIFICATION.

### Improvements in Reciprocating Pumps of the Wobbler Type

We, CLAYTON DEWANDRE COMPANY LIMITED, a British Company, and WILLIAM MILLER CALLA, a British subject, both of Titanic Works, Lincoln, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to a multi-cylinder pump suitable for operating hydraulic tipping gear for vehicles and of the kind in which the pistons or plungers work in parallel cylinder bores spaced from a central axis and are reciprocated by the action of a wobble plate mounted on a central driving shaft at one end of the cylinder block.

20 The object of the invention is to provide an improved or simplified construction of multi-cylinder pump of the kind just described and particularly to improve the driving mechanism.

25 According to the invention, the wobble plate is mounted by means of a journal and single thrust bearing upon an inclined crank or eccentric on the central driving shaft and is thrust endwise against its bearing on the inclined crank by the action of springs which push the plungers outwards in their cylinder bores and maintain the ends of the plungers in frictional contact with the wobble plate.

30 According to a preferred form of the invention, one end of the central driving shaft is supported in a journal bearing in the end of the cylinder block, a further bearing located on the side of the crank remote from the cylinder block being constructed to take the endwise thrust.

40 In order to lubricate the driving mechanism and also to carry away any excess oil which may leak past the plungers, according to a subsidiary feature of the invention, a connection is made between the oil supply pipe and a chamber housing the wobble plate, so that the wobble plate chamber is normally filled with oil at the pressure of the intake side of the pump.

The invention will be completely understood from the following description with reference to the accompanying

drawings in which:

Figure 1 is a longitudinal section of an oil pump constructed according to the invention and

Figure 2 is an end view of the cylinder block with the cap removed.

As shown in the drawing, the pump comprises a cylinder block 1 formed with cylinder bores 2 arranged parallel to one another at equal distances from the central axis. The cylinder block is formed at one end with a tubular extension 3 to accommodate the wobble plate and at the opposite end with a central projection 4 which is of smaller diameter than the circle of cylinders 2 so that a flat annular shoulder 5 is formed which is pierced by the ends of the cylinder bores.

The cylinder bores 2 communicate through radial passages 6 with valve chambers 7 formed in the projection 4, and a cap 8 which spigots over the projection 4 and is adapted to be clamped to the cylinder block by means of bolts 9 provides a receiving chamber 10 for the pressure fluid delivered from the cylinder bores through the passages 6 and valve chambers 7. Outlet valves 11 which are preferably of the ball type are mounted in the valve chambers 7. These valves 11 are held against their seats by springs 12 bearing against ported blocks 13 screwed into the open ends of the chambers 7. It will be seen that the plugs 13 and valves 11 are readily removable after removal of the cap 8.

The inlet valves which are preferably also of the ball type, are mounted in hollow plugs 14 screwed into the ends of the cylinder bores 2, each inlet valve 15 being pressed against a seat formed in the plug 14 by means of a spring 16 supported by a thimble 17. The thimbles 17 conveniently support the ends of coil springs 18 acting on pistons or plungers 19 working in the cylinder bores 2, the springs 18 tending to thrust the plungers outwards and into engagement with the wobble plate. The pressure of each spring 18 holds the thimble 17 against a shoulder 17a formed in the plug 14.

The cap 8 is formed with an annular

inlet chamber 20 which surrounds the projection 4 and is clamped against the annular face 5 when the cap is in position. Ports 21 cut through the walls of the annular chamber 20 establish communication between the ends of the cylinder bores and the interior of the annular chamber. These ports 21 may conveniently be arranged to accommodate portions of the plugs 14 which project from the annular shoulder 5 as illustrated.

The wobble plate 22, which is accommodated within the hollow extension 3 of the cylinder block, is rotatably mounted by means of tapered roller bearings 23 upon an inclined crank or eccentric 24 provided on a central driving shaft 25 protruding through a tubular boss 26 on a cover plate 27. The inner end of the shaft 25 is supported in a journal bearing in the end of the cylinder block as shown in Figure 1.

A flanged sleeve 28 inserted into the tubular boss 26 provides a bearing for the shaft 25 and also for a shoulder 29 formed on the shaft 25, so that the flange of the sleeve 28 receives the end thrust due to the action of the springs 18. A stuffing box or other suitable packing 30 is also provided in the tubular boss 26 beyond the bearing sleeve 28.

The cap 8 is provided with an internally threaded central hollow boss 8a for connection to a delivery pipe and with a socket 8b for connection to the oil supply pipe 31. The hollow extension 3 of the cylinder block is filled with oil and a pipe connection 32 is provided through which the supply pipe 31 communicates with the interior of the hollow extension 3. This arrangement provides not only for the lubrication of the bearings 23, 28 but also for return to the supply conduit of any excess oil which may escape past the plungers 2.

The operation of the pump will be apparent from the foregoing description taken in conjunction with the accompanying drawing. When the driving shaft 25 is rotated, the movement of the wobble plate imparts reciprocating movement to the pistons in a manner which will be readily understood so that oil from the supply pipe is drawn into the cylinder

bores through the inlet valves 15 and forced through the outlet valves 11 into the delivery chamber 10. On removal of the cap 8 the inlet and outlet valves can easily be inspected or withdrawn for adjustment or renewal and after the inlet valves have been removed, the plungers 2 can also be withdrawn if required. Similarly, the driving shaft 25 and the parts carried thereby can easily be detached by first removing the cover plate 27.

Having now particularly described and ascertained the nature of our said invention and what manner the same is to be performed, we declare that what we claim is:—

1. A multi-cylinder pump of the kind referred to wherein the wobble plate is mounted by means of a journal and single thrust bearing upon an inclined crank or eccentric on the central driving shaft and is thrust endwise against its bearing on the inclined crank or eccentric by the action of springs which push the plungers outwards in their cylinder bores and maintain the ends of the plungers in frictional contact with the wobble plate.

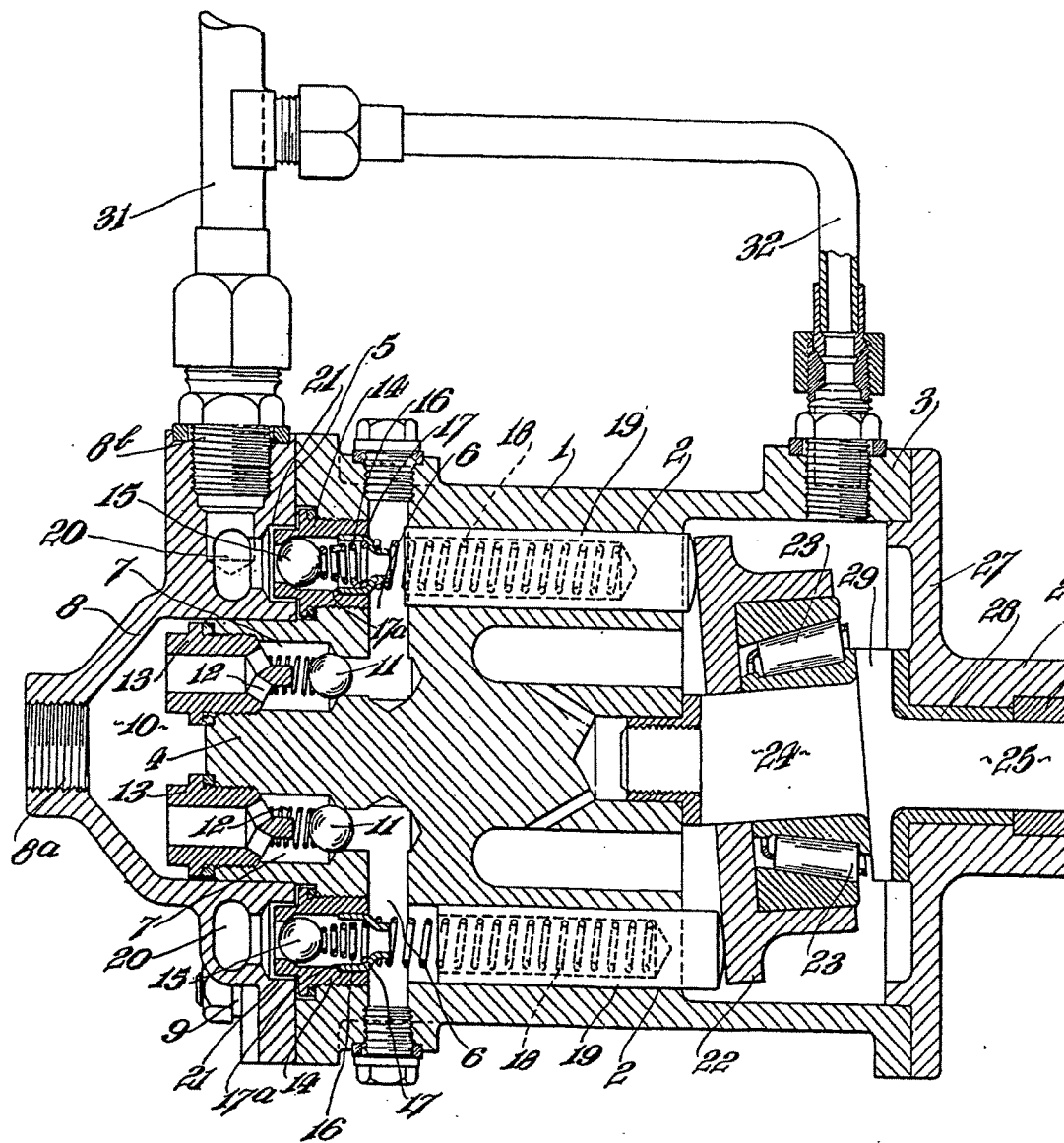
2. A multi-cylinder pump as claimed in claim 1 wherein one end of the central driving shaft is supported in a journal bearing in the end of the cylinder block, a further bearing located on the side of the crank or eccentric remote from the cylinder block being constructed to take the endwise thrust.

3. A multi-cylinder pump as claimed in either of the preceding claims wherein a connection is made between the oil supply pipe and a chamber housing the wobble plate for the purpose of lubricating the driving mechanism and carrying away excess oil which may leak past the plungers.

4. The improved wobbler mechanism substantially as described and as illustrated in the accompanying drawing.

Dated this 2nd day of November, 1936.  
HERON ROGERS & CO.,  
Agents for Applicants,  
Bridge House,  
181, Queen Victoria Street,  
London, E.C.4.

[This Drawing is a reproduction of the Original on a reduced scale.]



*Fig. 1.*

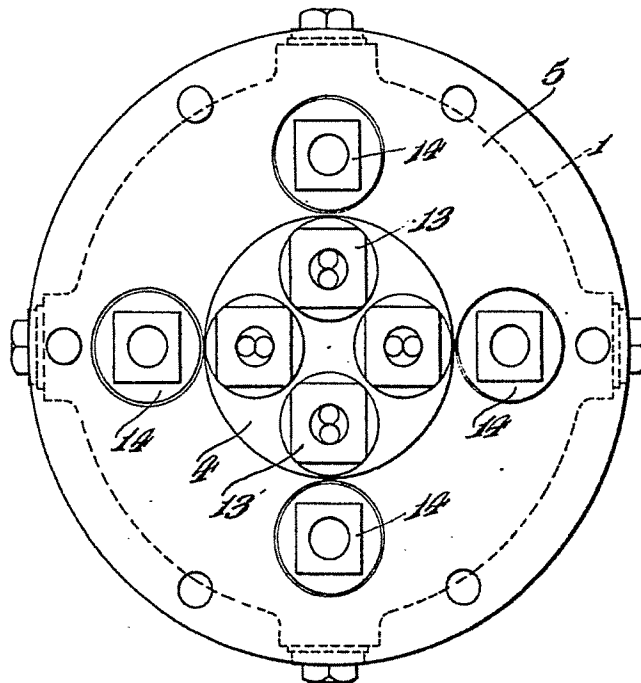
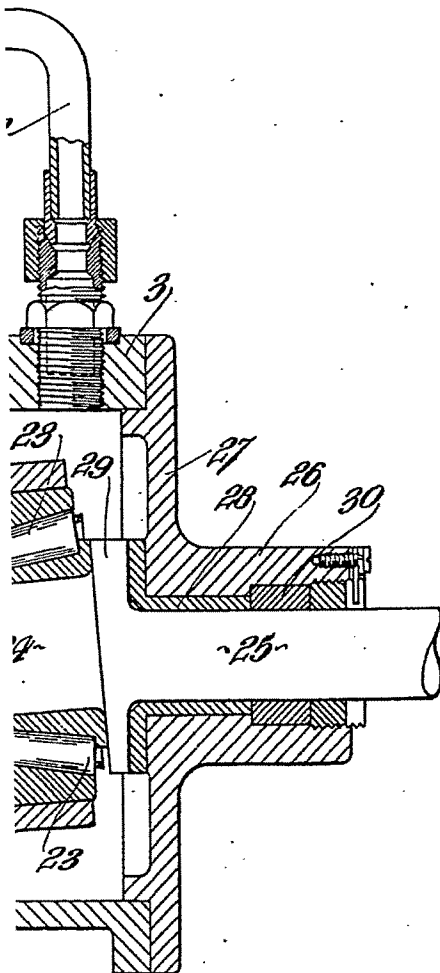


Fig. 2

[This Drawing is a reproduction of the Original on a reduced scale]

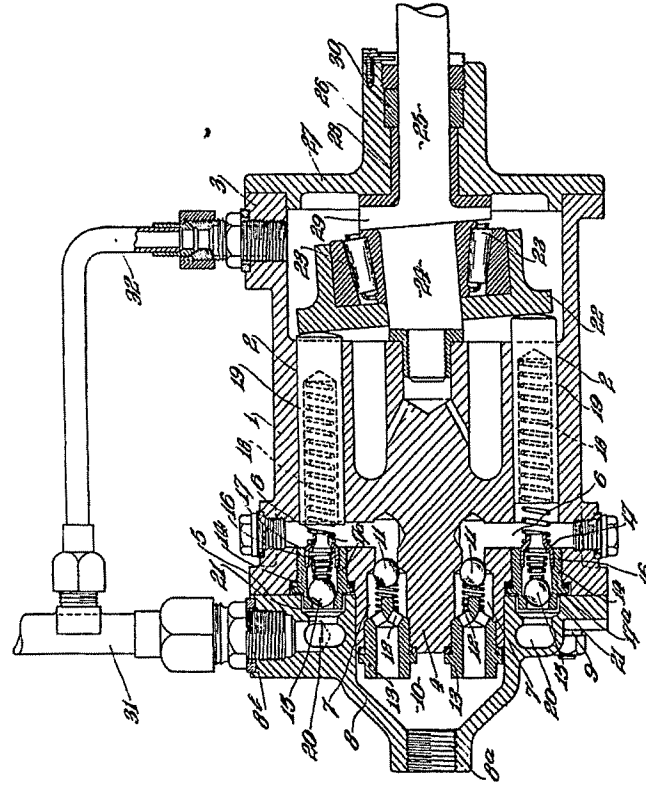


Fig. 1.

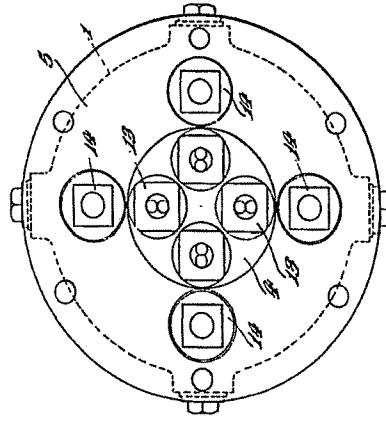


Fig. 2.